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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,698	09/23/2003	Chin-Cheng Yang	MXIC-P910218	2200
7590 08/24/2004			EXAMINER	
Kenton R. Mullins Stout, Uxa, Buyan & Mullins, LLP 4 Venture, Suite 300 Irvine, CA 92618			LE, DUNG ANH	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/668,698

Applicant(s)

YANG, CHIN-CHENG

Examiner

DUNG A LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-24 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-6, 9-14 is/are rejected.
- 7) ☒ Claim(s) 4, 7 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### ***Oath/Declaration***

The oath/declaration filed on 9/23/2004 is acceptable.

### ***Drawings***

The drawings are objected to for the following reason:

Figure 2B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections***

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1- 3, 5, 12- 14 are rejected under 35 USC 102 (e) as being anticipated by Inoue et al. (6686108).**

Inoue et al. teaches a method, comprising:

providing a substrate 1 having a photoresist layer 2 formed thereon (col 2, lines 20-35);

providing a photomask over at least a portion of the photoresist layer, the photomask having a main pattern 3 and an assist pattern 4;

transferring the main pattern 3 to the photoresist layer; and

forming a pattern on the substrate .

**Regarding claim 2**, wherein the assist pattern is located adjacent to the main pattern; and the assist pattern does not overlap the main pattern (fig.1).

**Regarding claim 3**, wherein: the main pattern 3 and the assist pattern 4 are shaded to block radiation from reaching a portion of the photoresist layer; the main pattern and the assist pattern are formed on a transparent photomask plate; and the assist pattern is a like-scattering bar (col 4, lines 21- 40).

**Regarding claim 5**, wherein: the main pattern has a plurality of corners; the assist pattern is positioned proximate to at least one of the plurality of corners of the main pattern; and the assist pattern does not contact the main pattern. (fig. 2(a))

**Regarding claim 12**, wherein: the transferring of the main pattern to the photoresist layer comprises projecting radiation toward the main pattern; the forming of the pattern on the photoresist comprises removing a portion of the photoresist layer using a developer solution; and the forming of the pattern on the substrate comprises forming a rectangular photoresist pattern on the substrate.(col 8, lines 60+)

**Regarding claim 13**, structure formed using the method of claim 1 (fig 1).

**Regarding claim 14**, structure formed using the method of claim 2 (fig. 1).

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 6 and 9-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Inoue et al. (6686108) in view of the following remark.**

**Regarding claim 6**, Inoue et al. teach substantially the entire method, as applied to claim 1 above, except for the assist pattern is a like-scattering bar; and the main pattern and the assist pattern have a rectangular shape as cited in current claim.

It would have been an obvious to one having ordinary skill in the art at the time the invention was made to modify the square shape of Inoue to above-identified shapes for main and assist patterns, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

**Regarding claims 9, 10 and 11**, Inoue et al. does not teach the transferring of the main pattern to the photoresist layer comprises performing an exposure process on the main pattern; the exposure process does not transfer the assist pattern to the photoresist layer; and the exposure process is performed for between about 0.1 seconds and 2.0 seconds and the transferring of the main pattern to the photoresist layer comprises performing an exposure process on the main pattern; and the exposure process comprises exposure to energy of between about 20 milli-joule/square centimeter and 50 milli-joule/square centimeter and the transferring of the main pattern to the photoresist layer comprises exposing the main pattern to energy ranging from between about 20 milli-joule/square centimeter to 50 milli-joule/square centimeter; and the exposing of the main pattern to energy is for between about 0.1 seconds and 2.0 seconds.

However, the selection of the abovementioned parameters such as energy, concentration, temperature, time, molar fraction, depth, thickness, etc., would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in energy, concentration, temperature, time, molar fraction, depth, thickness, etc., or in combination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

### **Reasons for Indication of Allowable Subject Matter**

**Claims 4, 7, 8 are objected** to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Inoue et al. (6686108) and The Background of the Invention , taken individually or in combination, do not teach the claimed invention having (Regarding claim 4) the main pattern is shaded to block radiation from reaching a first portion of the photoresist layer; the assist pattern is transparent to allow radiation to pass to a second portion of the photoresist layer; the main pattern and the assist pattern are formed on a transparent photomask plate; **(Regarding claim 7)** the main pattern has a length and a width, the length being greater than the width; the assist pattern has a length and a width, the length being greater than the width; the length of the main pattern is oriented substantially parallel to the length of the assist pattern; and the width of the assist pattern is between about 60 nanometers and 80 nanometers; **(Regarding claim 8)** the main pattern has a length and a width, the length being greater than the width; the assist pattern has a length and a width, the length being greater than the width; the length of the main pattern being oriented substantially perpendicular to the length of the assist pattern; and the length of the assist feature is greater than one-half the width of the main pattern.



**Claims 15- 22 and 23-24 would be allowed.**

The following is a statement of reason for the indication of allowable subject matter:

**Claims 15- 22 and 23-24 are considered allowable** since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Inoue et al. (U.S. Patent No. 6686108) and The Background of the Invention , taken individually or in combination, do not teach the claimed invention having ( **Regarding claim 15**) the step of exposing the photomask to an energy field to transfer an image, which is defined by the plurality of openings, to the photoresist layer, wherein the transferred image has a plurality of illuminated areas which correspond to the portion of the plurality of openings but which overlap and (**Regarding claim 23**) a lithography process, comprising: the step of performing an over-exposure step to translate the at least four openings and a corresponding substantially rectangular image positioned between the at least four openings to the photoresist layer.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Friday 8:00am- 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE  
Primary Examiner  
Art Unit 2818

Dle